

Claims:

1. A hydrogen-absorbing storage material containing hydrogen-absorbing alloy particles and a group VIII transition metal, wherein the group VIII transition metal is mechanically alloyed with the hydrogen-absorbing alloy particles at a ratio of 0.25% - 10 wt% transition metal to alloy particles to produce mechanically alloyed storage material particles.
2. The storage material of claim 1, wherein the mechanically alloyed storage particles comprise hydrogen-absorbing alloy particles having a diameter of between approximately 1 μm and 10 μm and transition metal particles disposed at least on the surface of the hydrogen-absorbing alloy particles and having a diameter of between approximately 0.1 μm and 1.0 μm .
3. The storage material of claim 1, wherein the hydrogen-absorbing alloy particles comprise at least one material selected from the group consisting of AB_x -type alloys, $\text{AB}/\text{A}_2\text{B}$ -type alloys, and AB_2 -type alloys.
4. The storage material of claim 3, wherein in the AB_x -type alloys, A is at least one element selected from group consisting of La, Ce, Pr, Nd, Ca, Y Zr, and Mischmetal, and B is at least one element selected from group consisting of Ni, Co, Mn, Al, Cu, Fe, B, Sn, Si, Ti, and x has a value between 4.5 and 5.5.
5. The storage material of claim 3, wherein in the $\text{AB}/\text{A}_2\text{B}$ -type alloys, A is at least one element selected from group consisting of Ti and Mg, and B is at least one element selected from group consisting of Ni, V, Cr, Zr, Mn, Co, Cu, and Fe.
6. The storage material of claim 3, wherein in the AB_2 -type alloys, A is at least one element selected from group consisting of Ti, Zr, Hf, Th, Ce and rare earth metals,

and B is at least one element selected from group consisting of Ni, Cr, Mn, V, Fe, Mn and Co, and x has a value between 1.5 and 2.5.

7. The storage material of claim 1, wherein the transition metal particles comprise at least one material selected from the group consisting of Pd, Pt, Ni, Ru, and Re.
- 5 8. The storage material of claim 1, and further comprising a binding agent which at least partially covers the mechanically alloyed storage material particles so as to effect firm binding between said mechanically alloyed storage material particles while allowing free passage of hydrogen in and out of the mechanically alloyed storage material particles.
- 10 9. The material of claim 8, wherein said binding agent is present in an amount not exceeding 1 part by weight of 100 parts of said mechanically alloyed storage material particles.
10. The material of claim 8, wherein said binding agent is selected from the group consisting of polyethylene oxide (PEO), polyvinylidene fluoride,
15 hydroxypropylmethyl cellulose, ethyl cellulose, organic conductive polymer, PTFE, PVA, acrylic copolymers and Nafion™.
11. The material of claim 8, and further comprising a solvent added to the binding agent, said solvent selected from the group consisting of water, 1-methyl-2-pyrrolidone, ethanol, methanol, heptane, toluene, carbitol acetate, and terpineol.
- 20 12. The material of claim 11, wherein said solvent is removed by drying.
13. The material of claim 11, wherein said mechanically alloyed storage material particles with the solvent has a low viscosity suitable for screen printing and ink-jet

printing applications.

14. The material of claim 1, wherein the material retains its hydrogen sorption/desorption effectiveness after exposure to ambient air and water.

15. The material of claim 1, wherein the material retains its hydrogen sorption/desorption effectiveness after exposure to aqueous solutions of potassium hydroxide.

16. A process for producing a hydrogen-absorbing storage material, comprising:
preparing a hydrogen-absorbing alloy particles with a diameter of approximately between 1 μm and 10 μm ;
adding group VIII transition metal particles having a diameter of approximately between 0.1 μm and 1.0 μm ; and
mechanically alloying the hydrogen-absorbing alloy particles and the group VIII transition metal particles to form mechanically alloyed hydrogen-absorbing storage material particles.

17. The process of claim 16, and further comprising adding to the mechanically alloyed hydrogen-absorbing storage material particles a binding agent which at least partially covers the mechanically alloyed hydrogen-absorbing storage material particles so as to effect firm binding between said mechanically alloyed hydrogen-absorbing storage material particles while allowing free passage of hydrogen in and out of the mechanically alloyed hydrogen-absorbing storage material particles.

18. The process of claim 17, wherein the binding agent is selected from the group consisting of polyethylene oxide (PEO), polyvinylidene fluoride,

hydroxypropylmethyl cellulose, ethyl cellulose, organic conductive polymer, PTFE, PVA, acrylic copolymers and Nafion™.

19. The process of claim 16, and further comprising adding to the mechanically alloyed hydrogen-absorbing storage material particles a solvent, making a solution with a sufficiently low viscosity to be suitable for deposition by at least one of thick film printing and ink jet printing.
20. The process of claim 19, wherein the solvent is selected from the group consisting of water, 1-methyl-2-pyrrolidone, ethanol, methanol, heptane, toluene, carbitol acetate, and terpineol.
21. The process of claim 16, wherein the hydrogen-absorbing alloy particles comprise at least one material selected from the group consisting of AB_x-type alloys, AB/A₂B-type alloys, and AB₂-type alloys.
22. The process of claim 16, wherein the transition metal particles comprise at least one material selected from the group consisting of Pd, Pt, Ni, Ru, and Re.
23. A microfabricated fuel cell comprising:
 - a substrate;
 - a hydrogen-absorbing storage material disposed in or on said substrate, said hydrogen-absorbing storage material containing hydrogen-absorbing alloy particles and a group VIII transition metal, wherein the group VIII transition metal is mechanically alloyed with the hydrogen-absorbing alloy particles at a ratio of 0.25% - 10 wt% transition metal to alloy particles;
 - an anode current collector disposed on the hydrogen-absorbing storage material;

an anode catalyst disposed on the anode current collector;

a polymer electrolyte disposed on the anode catalyst;

a cathode catalyst disposed on the polymer electrolyte; and

a cathode current collector disposed on the cathode catalyst.

5 24. The fuel cell of claim 23, wherein the hydrogen-absorbing storage material, the
anode current collector, the anode catalyst, the polymer electrolyte, the cathode
catalyst, and the cathode current collector are applied by one of screen printing or
ink jet printing.

10 25. A microfabricated electronic device comprising an electric power source
implemented as the fuel cell of claim 23 and an electronic circuit powered by the
fuel cell.